

CLAIMS:

1. An optical recording and reading system for use with an optical data storage medium (5), said system comprising:

- the medium (5) having a recording stack (9), formed on a substrate (8), said recording stack suitable for recording by means of a focused radiation beam (1) with a wavelength λ in air, the recording stack having a first optical surface (6) most remote from the substrate (8); and
- an optical head (3), with an objective (2) having a numerical aperture NA and from which objective (2) the focused radiation beam emanates (1) during recording, the objective (2) arranged on the recording stack (9) side of said optical data storage medium (5) and having a second optical surface (7) closest to the recording stack (9), and adapted for recording/reading at a free working distance d_F of smaller than $50 \mu\text{m}$ from the first optical surface (6), characterized in that at least one of the first optical surface (6) and the second optical surface (7) is provided with a transparent hydrophobic layer (10) that has a refractive index n and has a thickness smaller than $0.5\lambda/n$.

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2. A system according to claim 1, wherein the second optical surface (7) is provided with a hydrophobic layer (11) that has a thickness substantially equal to $0.25\lambda/n$.

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3. A system according to claim 1, wherein the second optical surface (7) is provided with a hydrophylic layer (11) that has a thickness substantially equal to $0.25\lambda/n$.

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4. A system according to claim 1, wherein the optical head (3) further comprises a magnetic coil (4) arranged at a side of the optical head (3) closest to the recording stack (9) such that an optical axis of the optical head (3) traverses the center of the magnetic coil (4) and the recording stack (9) of the optical data storage medium (5) is of the magneto-optical type.

5. A system according to claim 4, wherein the magnetic coil (4) has an inner diameter smaller than $60 \mu\text{m}$.

6. A system according to any one of claims 1-5, wherein the hydrophobic layer (10, 11) comprises a material selected from the group of poly-para-xylylenes, fluorocarbons and copolymers thereof.

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7. A system according to any one of claims 4-6, wherein the magnetic coil (4) is contained in a partially transparent slider, that is adapted for flying at a distance of $> 0.5\lambda/n$ and $< 2 \mu m$ from the first surface (6).

10 8. An optical data storage medium (5) having a recording stack (9), formed on a substrate (8), said recording stack suitable for recording by means of a focused radiation beam (1), with a wavelength λ in air, the recording stack having a first optical surface most remote from the substrate, characterized in that the first optical surface (6) is provided with a transparent hydrophobic layer (10) that has a refractive index n and has a thickness smaller
15 than $0.5\lambda/n$.

9. An optical data storage medium according to claim 8, wherein the first optical surface is provided with a hydrophobic layer (10) that has a thickness smaller than $0.25\lambda/n$.

20 10. An optical data storage medium (5) according to claim 8 or 9, wherein the hydrophobic layer comprises a material selected from the group of poly-para-xylylenes, fluorocarbons and copolymers thereof.

25 11. Use of an optical data storage medium (5) according to anyone of claims 8-10 for reliable recording and reading in a system as claimed in anyone of claims 1-5.